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EXAMINER	
GE, YUZHEN	
ART UNIT	**PAPER NUMBER**
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NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/725,061	Applicant(s) SATO ET AL.	
	Examiner Yuzhen Ge	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *11/15/07*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Examiner's Remark

Applicant's amendment, filed on Nov. 14, 2007, has been received and entered into the file. No amendment to the claims is made. Claims 1-10 are pending.

Regarding applicant's argument that Legall fails to teach or suggest "a search range determination step of determining motion vector search ranges respectively within the plurality of reference frame images" as recited in claim 1, the examiner disagrees. Legall clearly teach " a search range determination step of determining motion vector search ranges respectively within the plurality of reference frame images" in step 100 of Fig. 4B. A search area is a search range for motion vector. As also indicated by the applicant, Legall clearly states that "a search area in the frame P is similarly decimated". A search area is decimated means that a reduced sized search area is generated, which is exactly what is recited in the claim limitations of claim 1. The search range determination step of claim 1 is based on "the sized-reduced block and other sized-reduced blocks and a plurality of sized-reduced reference images..." and Legall clearly teaches that. Claim limitations of claim 1 never recites the a search range within a full reference frame is determined. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Therefore Legall teaches and suggest all the claim limitations of claim 1.

Regarding applicant's argument that Butter fails to teach or suggest a search range determining step as recited in claim 1, the examiner disagrees again. The claim limitations of claim 1 clearly recite that the determining step is based on "the sized-reduced block and other

sized-reduced blocks and a plurality of sized-reduced reference images…" and Butter, like Legall, clearly teaches that.

Regarding applicant's argument that Butter fails to teach or suggest a search range determining step as recited in claim 1, Butter, like Legall, necessarily fails to teach or suggest "a detecting step of detecting an optimal motion vector by using each of the motion vector search ranges determined in the search range determining step", the examiner disagrees again. Butter, like Legall, clearly teach the search range determining step in claim 1 (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49). Butter also teaches determining search windows/ranges corresponding to full reference macroblocks (col. 7, lines 18-34). When a search is conducted to see which block in a reference frame matches best with the current block, a search range/window/area is needed so that the search can be performed. Otherwise, there would be no range/window/area to search for best match and motion vectors. Furthermore, Butter and Legall clearly teach detecting the best match or optimal motion vector (Figs. 3 and 5-6 of Butter and Figs. 4A-4B of Legall and the columns cited in the respective rejections).

Claim 7 depends from claim 1 and applicant's argument with respect to claim 7 is based on that of claim 1 and therefore, Butter and Sullivan teach and suggest all the limitation of claim 7.

Claim 10 is the corresponding apparatus claim of claim 1. Applicant's argument of claim 10 is based on that of claim 1 or similar to that of claim 1. Therefore Butter and Legall teach all the limitations of claim 10.

The 102 and 103 rejections of claim 1-10 have not been overcome by the arguments.

Claim Rejections - 35 USC § 102

1. Claims 1 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Legall (US Patent 5,761,398).

Regarding claim 1, Legall teaches a method for compensating for motion prediction on each of a plurality of motion compensating blocks formed by dividing an objective frame image of successive frame images by using a plurality of reference frame images while sequentially changing pixel-based sizes of the plurality of motion compensating blocks (col. 1, lines 47-67, col. 2, lines 13-15, lines 39-42, lines 56-65, Fig. 4B, col. 10, lines 28-col. 11, line 5), the method comprising steps of:

a hierarchizing step of thinning out pixels of a motion compensating block having a greatest pixel-based size to be taken as an uppermost layer of among blocks with smaller pixel-based sizes, to generate a size-reduced block in a lower layer having a predetermined size-reduction ratio (Fig. 4B, col. 10, lines 28-col. 11, line 5);

a search range determining step of determining motion vector search ranges respectively within the plurality of reference frame images, on the basis of the size-reduced block and other size-reduced blocks, and a plurality of size-reduced reference images reduced in size corresponding to the size-reduction ratios of the sized-reduced block and other size-reduced blocks respectively (Fig. 4B, col. 10, lines 28-col. 11, line 5, the search area is considered to be the search range and is determined before the search is performed); and

a detecting step of detecting an optimal motion vector while sequentially changing the pixel-based sizes of the plurality of motion compensating blocks by using each of the motion

vector search ranges determined in the search range determining step (Fig. 4B, col. 10, lines 28-col. 11, line 5).

Claim 10 is the corresponding apparatus claim of claim 1. Legall teaches an apparatus (Figs. 1A-1B, 7-7A, col. 8, lines 19-55). Thus Legall teaches claim 10 as evidently explained in the above-cited passages.

Claim Rejections - 35 USC § 102

2. Claims 1-6 and 8-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Butter et al (US Patent 6,549,575 B1).

Regarding claim 1, Butter et al teach a method for compensating for motion prediction on each of a plurality of motion compensating blocks formed by dividing an objective frame image of successive frame images by using a plurality of reference frame images while sequentially changing pixel-based sizes of the plurality of motion compensating blocks (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49), the method comprising steps of:

a hierarchizing step of thinning out pixels of a motion compensating block having a greatest pixel-based size to be taken as an uppermost layer of among blocks with smaller pixel-based sizes, to generate a size-reduced block in a lower layer having a predetermined size-reduction ratio (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49);

a search range determining step of determining motion vector search ranges respectively within the plurality of reference frame images, on the basis of the size-reduced block and other size-reduced blocks, and a plurality of size-reduced reference images reduced in size corresponding to the size-reduction ratios of the sized-reduced block and other size-reduced blocks respectively (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49, the search window is considered to be the search range and is determined before the search is performed); and

a detecting step of detecting an optimal motion vector while sequentially changing the pixel-based sizes of the plurality of motion compensating blocks by using each of the motion vector search ranges determined in the search range determining step (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49).

Claim 10 is the corresponding apparatus claim of claim 1. Butter et al teach an apparatus (Fig. 1). Thus Butter et al teach claim 10 as evidently explained in the above-cited passages.

Regarding claim 2, Butter et al teach a method for compensating for motion prediction according to claim 1, wherein the search range determining step determines the motion vector search ranges depending upon respective differences in pixel-based values from respective of the size-reduced reference images (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49).

Regarding claim 3, Butter et al teach a method for compensating for motion prediction according to claim 2, wherein the search range determining step carries out block matching sequentially on the size-reduced reference images with the size-reduced block, so as to determine the search ranges on the basis of an absolute-value sum of a difference between a pixel-based value within the size-reduced block and a pixel-based value within a block corresponding to the size-reduced block within a predetermined size-reduced reference image (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49).

Regarding claim 4, Butter et al teach a method for compensating for motion prediction according to claim 3, wherein the search range determining step determines the search ranges depending upon an absolute-value sum of differences between a pixel value of every other pixel with respect to a horizontal direction and a vertical direction of the size-reduced block and a pixel-based value within a corresponding portion of pixel-based values within the size-reduced block (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49, the absolute difference depends on all the pixel values or the size-reduced block and therefore depends on the absolute-value sum of difference between a pixel value of every other pixel, also every other pixel of a ¼ reduced size block is used for evaluating the absolute difference for the 1/16 reduced size block).

Regarding claim 5, Butter et al teach a method for compensating for motion prediction according to claim 3, wherein the search range determining step determines as one of the motion vector search ranges a peripheral pixel range including an enlarged lower layer motion vector enlarged

from a lower layer motion vector between a corresponding portion of pixels where an absolute-value sum of pixel-based values within the size-reduced block is minimum and the size-reduced block (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49, 4:1 represents lowest level and 1:1 represents the highest level, enlargement is done because the search range is smaller).

Regarding claim 6. A method for compensating for motion prediction according to claim 1, further comprising: a search range selecting step of selecting only the search ranges within the size-reduced reference images in which a difference of pixel-based values is minimized from the respective size-reduced blocks of among search ranges within the size-reduced reference images determined in the search range determining step, wherein the detecting step further includes detecting an optimal motion vector by using only search ranges within the size-reduced reference images selected in the search range selecting step (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49).

Regarding claim 8, Butter et al teach a method for compensating for motion prediction according to claim 1, wherein the detecting step includes detecting an optimal motion vector based on a Rate Distortion optimization process (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, col. 8, lines 38-49, the minimization of the absolute difference is regarded as the rate distortion optimization process).

Regarding claim 9, Butter et al teach a method for compensating for motion prediction according to claim 1, wherein the detecting step includes sequentially changing the pixel-based sizes of the motion compensating blocks from a greater pixel-based size to a smaller pixel-based size, so as to size-reduce the search range each time a change is made (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, the search range is reduced each time a change is made, col. 8, lines 38-49).

Claim Rejections - 35 USC § 103

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Butter et al in view of Sullivan et al ("Rate-Distortion Optimization for Video Compression", Gary J. Sullivan et al, IEEE Signal Processing Magazine, November 1998, pp. 74-90, cited by IDS).

Regarding claim 7, Butter et al teach a method for compensating for motion prediction according to claim 1, wherein: the detecting step includes detecting the optimal motion vector depending on respective differences in pixel-based values between the size-reduced blocks and the size-reduced reference images (Figs. 5-8, col. 6, lines 3-23, col. 6, line 57-col. 7, line 10, col. 7, lines 13-34, the search range is reduced each time a change is made, col. 8, lines 38-49). However they do not explicitly teach detecting the optimal motion vector depending on a quantizing scale function and a generation code amount for the motion vector differences. In the same field of endeavor, Sullivan et al teach detecting the optimal motion vector depending on a quantizing scale function and a generation code amount for the motion vector differences (left column of Page 82, equation (9), left column of Page 84, equation (11), Page 86). It is desirable to increase

the overall performance of a video codec (bottom two paragraphs of left column of Pages 80 and 81, middle paragraph of right column of Page 81). Therefore it would have been obvious to one of ordinary skill in the art, at the time of invention, to use the method of Sullivan et al to detect the optimal motion vector also depending on a quantizing scale function and a generation code amount for the motion vector difference in the method of Butter et al so that the overall performance of a codec can be improved.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US Patent 6,968,009 B1 by Straasheijm.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuzhen Ge whose telephone number is 571-272 7636. The examiner can normally be reached on 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Yuzhen Ge
Examiner
Art Unit 2624

WENPENG CHEN
PRIMARY EXAMINER

12/4/07